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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,216	03/11/2004	Joon Chok Lee	70040124-1	7414

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EXAMINER	
AMADIZ, RODNEY	

ART UNIT	PAPER NUMBER
2629	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/799,216	LEE ET AL.
	Examiner	**Art Unit**
	Rodney Amadiz	2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-7 and 9-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muthu (U.S. Patent 6,507,159—herein referred to as "Muthu") in view of Zhang et al. (U.S. Patent 5,461,397—hereinafter "Zhang").

As to **Claim 1**, Muthu teaches a control system for a Light Emitting Diode (LED) based light system ***(Fig. 1)***, comprising: a plurality of feedback units for generating feedback signals representative of luminance and chrominance characteristics ***(Reference Numbers 20 and 21 and Col. 1, line 55—Col. 2, line 4 and Col. 4, lines 38-66)***; and a controller in signal communication with said plurality of feedback units configured to provide drive signals to light source assemblies ***(30 and 33)*** and to adjust said drive signals on a per-light source assembly and a per-light source basis in response to feedback signals from said plurality of feedback units ***(Col. 1, line 55—Col. 2, line 4 and Col. 3, line 57—Col. 4, line 15)***. Muthu also teaches the light source assembly comprising a light source of a first color and a light source of a second color, the first and second colors being different ***(11—RGB LED light sources)***. Muthu, however, fails to teach a plurality of light sources. Examiner cites Zhang to teach a plurality of

light sources for an LCD back light ***(Fig. 1, 32—Backlights 1-N and Col. 5, lines 30-40)***. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to provide multiple light sources as taught by Zhang in the LED control system taught by Muthu in order to increase the overall brightness of the device and to provide backup lighting in case one of the LED units is faulty.

Muthu also fails to teach that a light source of the first color in a first light source assembly and a light source of the first color in a second light source assembly are driven at non-overlapping intervals and such that a light source of the second color in the first light source assembly and a light source of the second color in the second light source assembly are driven at non-overlapping intervals. Examiner again cites Zhang to teach that a light source of the first color in a first light source assembly and a light source of the first color in a second light source assembly are driven at non-overlapping intervals and such that a light source of the second color in the first light source assembly and a light source of the second color in the second light source assembly are driven at non-overlapping intervals ***(Fig. 2, note SUB-SECTION I and SUB-SECTION 4 and note that the RGB Backlight in Sub-section one is driven in a non-overlapping period compared to Sub-section 4 (i.e. for Sub-section 1 R, G, B are driven in times T_0, T_1, T_2 respectively and for Sub-section 4, R, G, B are driven in times T_1, T2, T3 respectively, which is different than Sub-section 1)***. At the time the invention was made it would have been obvious to drive the light sources having the same colors operating in non-overlapping

intervals as taught by Zhang in the LED control system taught by Muthu in order to better control the white point and/or luminance properties of each assembly.

As to **Claim 2**, Muthu, as modified by Zhang, teaches a feedback unit of said feedback units further comprising: a sensor for sensing luminance and chrominance characteristics during one of said non-overlapping intervals, wherein said non-overlapping interval is associated with said sensor and with one of said light source assemblies ***(Muthu—Fig. 1—note photosensors 21 (Rp, Gp and Bp) and Col. 1, line 55—Col. 2, line 4 and Col. 4, lines 38-66); as to the non-overlapping intervals note Zhang, Fig. 2, Sub-sections 1 and 4)***.

As to **Claim 3**, Muthu teaches a sample-and-hold module for sampling feedback signals from a sensor during a non-overlapping interval of said non-overlapping intervals and holding feedback signals during other non-overlapping intervals, wherein said non-overlapping interval is associated with said sample-and-hold module ***(Col. 8, lines 29-33)***.

As to **Claim 4**, Muthu, as modified by Zhang, teaches that each light source assembly further comprises a light source of a third color, wherein the first color is red, the second color is green and the third color is blue ***(Fig. 1, 11—RGB LED light sources)***. Muthu, however fails to teach that the drive signals are provided such that a light source of the third color in the first light source assembly and a light source of the third color in the second light source assembly are driven at non-overlapping intervals. Examiner cites Zhang to teach the drive signals are provided such that a light source of the third color in the first light source assembly and a light source of the third color in the second light source

assembly are driven at non-overlapping intervals ***(Fig. 2, note SUB-SECTION I and SUB-SECTION 4 and note that the RGB Backlight in Sub-section one is driven in a non-overlapping period compared to Sub-section 4 (i.e. for Sub-section 1 R, G, B are driven in times T_0, T_1, T_2 respectively and for Sub-section 4, R, G, B are driven in times T_1, T2, T3 respectively, which is different than Sub-section 1)***. At the time the invention was made it would have been obvious to drive the light sources having the same colors operating in non-overlapping intervals as taught by Zhang in the LED control system taught by Muthu in order to better control the white point and/or luminance properties of each assembly.

As to **Claim 5**, Muthu teaches said controller acquiring differences between said feedback signals and a reference value and adjusts said drive signals on a per-color basis to compensate for said differences ***(21—note Rp, Gp and Bp and Col. 1, line 55—Col. 2, line 4 and Col. 3, line 17—Col. 4, line 15 and Col. 5, lines 5-25)***.

As to **Claim 6**, Muthu teaches a reference value generator for converting a reference input to CIE 1931 tristimulus reference values ***(32)***; and a feedback signal translator for converting a feedback signal of said feedback signals to CIE 1931 tristimulus measured values ***(See Figs. 2 and 4 and Col. 4, lines 38-65)***; wherein said controller acquires differences between said feedback signals and a reference value by determining a difference between said CIE 1931 tristimulus reference values and said CIE 1931 tristimulus measured values for each of said

feedback signals ***(See Figs. 2 and 4 and Col. 4, lines 38-65 and Col. 5, lines 5-67)***.

As to **Claim 7**, Muthu teaches a reference value generator for: converting a reference input to CIE 1931 tristimulus reference values ***(32)***; and translating said CIE 1931 tristimulus reference values to tristimulus reference values in RGB space, wherein said controller acquires differences between said feedback signals and a reference value by determining a difference between said tristimulus reference values in RGB space and said feedback signals ***(See Fig. 3 and Col. 5, lines 26-38)***.

As to **Claim 9**, Muthu, as modified by Zhang, teaches said controller providing said drive signals for a signal duration no longer than said non-overlapping interval; and said controller adjusts said drive signals on a per-color basis by changing said signal duration from a first duration to a second duration, wherein said second duration is no longer than said non-overlapping interval ***(Zhang—Fig. 2, Sub-sections 1 and 4)***.

As to **Claim 10**, most of the claim limitations have already been addressed with respect to Claim 1, with the exception of receiving light source assembly-specific and color-specific feedback signals in response to said providing drive signals to the plurality of light source assemblies during respective non-overlapping intervals; and adjusting said drive signals on a per-light source assembly and a per-color basis in response to the light source assembly-specific and color specific feedback signals. Muthu, as modified by Zhang, teaches receiving light source assembly-specific and color-specific feedback signals in

response to said providing drive signals to the plurality of light source assemblies during respective non-overlapping intervals **(20 and 21 *and Col. 1, line 55—Col. 2, line 4 and Col. 4, lines 38-66*)**; and adjusting said drive signals on a per-light source assembly and a per-color basis in response to the light source assembly-specific and color specific feedback signals ***(Col. 1, line 55—Col. 2, line 4 and Col. 3, line 57—Col. 4, line 15)***. Note that Zhang teaches the plural light assemblies being driven at non-overlapping intervals as mentioned in Claim 1.

As to **<u>Claim 11</u>**, Muthu, as modified by Zhang, teaches providing said drive signals in repeating sequential non-overlapping intervals ***(Zhang—Fig. 2, Sub-sections 1 and 4)***.

As to **<u>Claim 12</u>**, Muthu teaches acquiring differences between said light source-specific feedback signals and a reference value; and adjusting said drive signals on a per-color basis to compensate for said differences ***(21—note Rp, Gp and Bp and Col. 1, line 55—Col. 2, line 4 and Col. 3, line 17—Col. 4, line 15 and Col. 5, lines 5-25)***.

As to **<u>Claim 13</u>**, Muthu teaches receiving a reference input ***(31—Col. 3, line 47—Col. 4, line 20)***; converting said reference input to said reference value ***(32—Col. 3, lines 47-60)***; comparing said reference value to said light source-specific feedback signals ***(Controller 33—Col. 1, line 55—Col. 2, line 4 and Col. 3, line 17—Col. 4, line 15 and Col. 5, lines 5-25)***.

As to **<u>Claim 14</u>**, Muthu teaches receiving a reference input ***(31—Col. 3, line 47—Col. 4, line 20)***; converting said reference input to said reference value ***(32—Col. 3, lines 47-60)***, wherein said reference value includes CIE 1931

tristimulus values ***(See Figs. 2 and 4 and Col. 4, lines 38-65)***; converting said light source-specific feedback signals to CIE 1931 tristimulus values ***(See Fig. 4 and Col. 5, lines 26-59)***; and comparing said reference value to said light source-specific feedback signals ***(See Figs. 2 and 4 and Col. 4, lines 38-65 and Col. 5, lines 5-67)***.

As to **Claim 15**, Muthu teaches generating said light source-specific feedback signals according to luminance and chrominance characteristics of light from said light sources ***(Reference Numbers 20 and 21 and Col. 1, line 55—Col. 2, line 4 and Col. 4, lines 38-66)***.

As to **Claim 16**, all of the claim limitations have already been addressed with respect to Claims 1,4 and 16.

As to **Claim 17**, Muthu teaches the feedback units include color sensors for detecting luminance and chrominance characteristics of light ***(Reference Numbers 20 and 21—photosensors Rp, Gp and Bp and Col. 1, line 55—Col. 2, line 4 and Col. 4, lines 38-66)***.

As to **Claim 18**, Muthu, as modified by Zhang, teaches the feedback units include color sensors for generating light color-specific feedback signals ***(Reference Numbers 20 and 21 and Col. 1, line 55—Col. 2, line 4 and Col. 4, lines 38-66)***.

As to **Claim 19**, Muthu, as modified by Zhang, teaches the controller configured to provide light source assembly-specific and color-specific and light source-specific drive signals to the light sources in response to the light source assembly-specific and color-specific feedback signals ***(note signals output***

from controller 33 to drivers 14 and Col. 1, line 55—Col. 2, line 4 and Col. 3, line 57—Col. 4, line 15).

As to **Claim 20**, Muthu teaches the light source assemblies include red, green, and blue light emitting diodes (LEDs) ***(11 and Col. 3, lines 4-7)***; the feedback units include color sensors for generating color-specific feedback signals ***(Reference Numbers 20 and 21 and Col. 1, line 55—Col. 2, line 4 and Col. 4, lines 38-66)***; and the controller is configured to provide light source assembly-specific and color-specific drive signals to the light source assemblies in response to the light source assembly-specific and color-specific feedback signals ***(note signals output from controller 33 to drivers 14 and Col. 1, line 55—Col. 2, line 4 and Col. 3, line 57—Col. 4, line 15)***.

3. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Muthu and Zhang as applied to claims 1-7 and 9-20 above, and further in view of Ishiguchi (USPGPUB 2004/0013044—hereinafter "Ishiguchi").

As to **Claim 8**, Muthu, as modified by Zhang, teaches feedback units providing feedback related to luminance and chrominance characteristics related to light source assemblies with which said feedback units are associated ***(20 and 21—Rp, Gp and Bp and Col. 1, line 55—Col. 2, line 4 and Col. 4, lines 38-66)***. Muthu, as modified by Zhang, however, fails to teach a light guide panel for directing light from said light source assemblies to said feedback units. Examiner cites Ishiguchi to teach a light guide panel for directing light from said light source assemblies to said feedback units (Fig. 2, 104). At the time the invention was

made, it would have been obvious to a person of ordinary skill in the art to incorporate the use of a light guiding panel as taught by Ishiguchi in the LED control system taught by Muthu, as modified by Zhang, in order to uniformly irradiate light on a plane.

Response to Arguments

4. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Chin et al.	U.S. Patent 5,497,465
Chen	U.S. Patent 5,592,193
Yoshihara et al.	U.S. Patent 6,115,016
Noguchi et al.	U.S. Patent 6,243,067
Sakaguchi et al.	U.S. Patent 6,448,951
Muthu et al.	U.S. Patent 6,495,964
Rand et al.	U.S. Patent 6,521,879
Hoelen et al.	U.S. Patent 6,566,689
Morgan et al.	U.S. Patent 6,608,453
Johnson	U.S. Patent 6,608,614
Tamura et al.	U.S. Patent 6,611,000

Mizutani et al.	U.S. Patent 6,744,416
Kawabata et al.	U.S. Patent 6,870,525
Kim et al.	U.S. Patent 7,126,576
Morgan et al.	U.S. Patent 7,202,613
Aratani et al.	U.S. Patent 7,233,304
Akiyama	U.S. Patent 7,248,244
Hoelen et al.	USPGPUB 2001/0035853
Hirakata et al.	USPGPUB 2002/0067332
Ruby et al.	USPGPUB 2003/0043107
Akiyama	USPGPUB 2003/0214725
Numao	USPGPUB 2004/0017348
Yamamoto et al.	USPGPUB 2004/0125062
Lee et al.	USPGPUB 2005/0134197
Groeger	USPGPUB 2005/0253921
Sugino et al.	USPGPUB 2005/0259064

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory

action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Inquiries

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney Amadiz whose telephone number is (571) 272-7762. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on (571) 272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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